Notice of Allowability	Application No.	Applicant(s)	
	09/734,147	BHATOOLAUL ET AL.	
	Examiner	Art Unit	
	Jason M Perilla	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *the amendment filed October 27, 2004*.

2. ☒ The allowed claim(s) is/are *1-5, 7-15, and 17-22 renumbered respectively as claims 1-20*.

3. ☒ The drawings filed on *11 December 2000* are accepted by the Examiner.

4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☒ All b) ☐ Some* c) ☐ None of the:
      1. ☒ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date *20050412* .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

EXAMINER'S AMENDMENT

1. Claims 1-5, 7-15, and 17-22 are pending in the instant application.

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Eugene J. Rosenthal on April 12, 2005.

The application has been amended such that the following versions of claims 1, 2, 3, 8, 9, 10-13, 20, and 21 replace the prior versions of the claims in their entirety:

1. A method of detecting one of a set of preamble sequences in a spread signal comprising the steps of:

(a) correlating ~~the~~ a received spread signal with sequences of a first orthogonal Gold code (OGC) set in accordance with a first fast transform to provide a preamble signal;

(b) correlating the preamble signal with the set of preamble sequences in accordance with a second fast transform to generate a set of index values, wherein each index value of the set of index values corresponds to a one preamble sequence of the set of preamble sequences;

(c) forming a decision statistic based on the set of index values; and

(d) selecting, as the detected one of the set of preamble sequences, a preamble sequence corresponding to the decision statistic;

wherein step (c) comprises the steps of:

1) forming an initial decision statistic based on ~~the~~ a relative maximum index of the set of index values;

2) selecting ~~the~~ a signal generated by the preamble ~~sequence~~ signal combined with the preamble ~~signal~~ sequence corresponding to the relative maximum index of the initial decision statistic;

3) adjusting, in one or more of amplitude and phase, the selected signal ~~selected~~ in step 2); and

4) forming the decision statistic based on the adjusted selected signal.

2. The invention as recited in claim 1, wherein, for step (a), the first fast transform method is a fast orthogonal Gold code transform (FOGT) comprising the steps of

1) multiplying the received spread signal with a first sequence vector and a forward permutation vector to generate a permuted sequence signal, wherein:

the first OGC set is generated from the first sequence vector and a cyclic shift matrix of a second sequence vector, and the forward permutation vector maps between i) the cyclic shift matrix of the second sequence vector and ii) a matrix of Walsh-Hadamaard sequences; and

2) applying ~~the~~ a fast Hadamaard transform to the permuted sequence signal to generate a set of correlated signals, the preamble signal selected as one of the set of correlated signals based on a predetermined decision criterion.

3. The invention as recited in claim 1, wherein:

for step (b), the set of preamble sequences are selected from a second OGC set formed from first and second sequence vectors, the second OGC set generated from the first sequence vector and a cyclic shift matrix of ~~a~~ the second sequence vector; and wherein

the second fast transform is a fast orthogonal Gold code transform (FOGT) comprising the steps of

1) multiplying the preamble signal with ~~a~~ the first sequence vector and a forward permutation vector to generate a permuted preamble signal, the forward permutation vector mapping between i) the cyclic shift matrix of the second sequence vector and ii) a matrix of Walsh-Hadamaard sequences, and

2) applying ~~the~~ a fast Hadamaard transform to the permuted preamble signal to generate the set of index values.

8. The invention as recited in claim 1, wherein step (c2) employs the initial decision statistic to locally generate a corresponding preamble sequence, the locally generated preamble sequence being combined with the preamble signal ~~f~~ for coherent sequence detection.

9. A method of detecting one of a set of preamble sequences in a spread signal comprising the steps of:

(a) correlating ~~the~~ a received spread signal with a set of orthogonal sequences to provide a preamble signal;

(b) correlating the preamble signal with one or more preamble sequences of an orthogonal Gold code (OGC) set in accordance with a fast transform to generate a set of index values, wherein each index value of the set of index values corresponds to a one preamble sequence of the set of preamble sequences;

(c) forming a decision statistic based on the set of index values; and

(d) selecting, as the detected one of the set of preamble sequences, a preamble sequence corresponding to the decision statistic;

wherein step (c) comprises the steps of:

1) forming an initial decision statistic based on ~~the~~ a relative maximum index of the set of index values;

2) selecting ~~the~~ a signal generated by the preamble ~~sequence~~ signal combined with the preamble ~~signal~~ sequence corresponding to the relative maximum index of the initial decision statistic;

3) adjusting, in one or more of amplitude and phase, the selected signal ~~selected~~ in step 2); and

4) forming the decision statistic based on the adjusted selected signal.

10. The invention as recited in claim 9, wherein:

for step (b), each preamble sequence is selected from the OGC set formed from first and second sequence vectors, wherein the OGC set is generated from the first sequence vector and a cyclic shift matrix of ~~a~~ the second sequence vector; and wherein

the fast transform is a fast orthogonal Gold code transform (FOGT) comprising the steps of

1) multiplying the preamble signal with ~~a~~ the first sequence vector and a forward permutation vector to generate a permuted preamble signal, the forward permutation vector mapping between i) the cyclic shift matrix of the second sequence vector and ii) a matrix of Walsh-Hadamaard sequences; and

2) applying ~~the~~ a fast Hadamaard transform to the permuted preamble signal to generate the set of index values.

11. A preamble detector for detecting one of a set of preamble sequences in a spread signal, the preamble detector comprising:

a first correlator correlating ~~the~~ a received spread signal with sequences of a first orthogonal Gold code (OGC) set in accordance with a first fast transform to provide a

preamble signal;

a second correlator correlating the preamble signal with the set of preamble sequences in accordance with a second fast transform method to generate a set of index values, wherein each index value of the set of index values corresponds to a one preamble sequence of the set of preamble sequences;

a circuit forming a decision statistic based on the set of index values; and

a selector selecting, as the detected one of the set of preamble sequences, a preamble sequence corresponding to the decision statistic;

wherein the circuit forming the decision statistic comprises:

a first magnitude detector forming an initial decision statistic based on ~~the~~ a relative maximum index of the set of index values;

a signal selector selecting ~~the~~ a signal generated by the preamble ~~sequence~~ signal combined with the preamble ~~signal~~ sequence corresponding to the relative maximum index of the initial decision statistic;

a coherent detector adjusting, in one or more of amplitude and phase, the selected signal from the signal selector ~~selected in step 2)~~; and

a second magnitude detector forming the decision statistic based on the adjusted selected signal.

12. The invention as recited in claim 11, wherein the first fast transform is a fast orthogonal Gold code transform (FOGT), the first OGC set is generated from a first sequence vector and a cyclic shift matrix of a second sequence vector, and ~~the~~ a forward permutation vector maps between i) the cyclic shift matrix of the second sequence vector and ii) a matrix of Walsh-Hadamaard sequences; and wherein:

the first correlator comprises:

a multiplier multiplying the received spread signal with the first sequence vector and a the forward permutation vector to generate a permuted sequence signal; and

a combiner applying ~~the~~ a fast Hadamaard transform to the permuted sequence signal to generate a set of correlated signals, the preamble signal selected as one of the set of correlated signals based on a predetermined decision criterion.

13. The invention as recited in claim 11, wherein:

the set of preamble sequences is selected from a second OGC set formed from first and second sequence vectors, the second OGC set generated from the first sequence vector and a cyclic shift matrix of a the second sequence vector; and the second fast transform is a fast orthogonal Gold code transform (FOGT); and wherein:

the second correlator comprises:

a multiplier multiplying the preamble signal with a the first sequence vector and a forward permutation vector to generate a permuted preamble signal, the forward permutation vector mapping between i) the cyclic shift matrix of the second sequence vector and ii) a matrix of Walsh-Hadamaard sequences, and

a combiner applying ~~the~~ a fast Hadamaard transform to the permuted preamble signal to generate the set of index values.

20. A preamble detector for detecting one of a set of preamble sequences in a spread signal comprising ~~the steps of~~:

a first correlator correlating ~~the~~ a received spread signal with a set of orthogonal sequences to provide a preamble signal;

a second correlator correlating the preamble signal with one or more preamble sequences of an orthogonal Gold code (OGC) set in accordance with a fast transform to

generate a set of index values, wherein each index value of the set of index values corresponds to a one preamble sequence of the set of preamble sequences;

a circuit forming a decision statistic based on the set of index values; and

a selector selecting, as the detected one of the set of preamble sequences, a preamble sequence corresponding to the decision statistic;

wherein the circuit forming the decision statistic comprises:

a first magnitude detector forming an initial decision statistic based on ~~the~~ a relative maximum index of the set of index values;

a signal selector selecting ~~the~~ a signal generated by the preamble ~~sequence~~ signal combined with the preamble ~~signal~~ sequence corresponding to the relative maximum index of the initial decision statistic;

a coherent detector adjusting, in one or more of amplitude and phase, the selected signal from the signal selector ~~selected in step 2)~~; and

a second magnitude detector forming the decision statistic based on the adjusted selected signal.

21. The invention as recited in claim 20, wherein:

each preamble sequence is selected from the OGC set formed from first and second sequence vectors, wherein the OGC set is generated from the first sequence vector and a cyclic shift matrix of ~~a~~ the second sequence vector and the fast transform is a fast orthogonal Gold code transform (FOGT); and wherein

the second correlator comprises:

a multiplier multiplying the preamble signal with ~~a~~ the first sequence vector and a forward permutation vector to generate a permuted preamble signal, the forward permutation vector mapping between i) the cyclic shift matrix of the second sequence vector and ii) a matrix of Walsh-Hadamaard sequences; and

a combiner applying ~~the~~ a fast Hadamaard transform to the permuted preamble signal to generate the set of index values.

Claims 1-5, 7-15, and 17-22 are renumbered as claims 1-20, respectively, and the claim dependency is renumbered accordingly.

Allowable Subject Matter

3. Claims 1-5, 7-15, and 17-22 renumbered respectively as claims 1-20 are allowed.

4. The following is an examiner's statement of reasons for allowance:

Claims 1-5, 7-15, and 17-22 renumbered respectively as claims 1-20 are allowed because the prior art of record does not anticipate or obviate the claimed limitations. In particular the prior art does not disclose or teach adjusting in one or more of amplitude or phase a signal generated according to a maximum index of a set generated by a number of correlations between a received signal and a set of preamble sequences.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M Perilla whose telephone number is (571) 272-3055. The examiner can normally be reached on M-F 8-5 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (571) 272-3056. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jason M. Perilla
April 12, 2005

jmp

CHIEH M. FAN
PRIMARY EXAMINER